



# SPECIFICATION

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[A systemic process of theme-based digital game park location for three-dimensional interactive digital games is a juxtaposition of human or non-human characters in digitally rendered animation with interactive, participatory, experiential games]

## Background of Invention

[0001] Almost all location based entertainments have traditional dark and thrill rides including some water rides. These rides are surrounded with carnival type spot entertainment including meeting and playing with popular animated characters. Most of these rides are passive in nature visitors sit in a vehicle or floatation device and experience the thrill or environment of the ride and location of the park.

[0002] The present invention is generally relates to a location-based game facility or park which is a juxtaposition of three-dimension digitally rendered animation of human or non-human characters in with interactive, participatory, experiential games for children and families with experiential, participatory and interactive games in a digital animation and 3D simulation environment. These three-dimensional rendering virtual-reality displays for interactive (voice activated chat-enabled devices) that communicate with the participants and user-audience simultaneously in terms of providing information through a medium or requesting pre-determined data input and status message indicating a communication state.

[0005] The 3D phot0-realistic game environment has devices or set of devices (apparatuses) that are synchronized with audio-means, visual means and physical means which allows participants to interact with the digital screen as a stimulus and response for visual and audio outputs in a manner corresponding to participant movements and engagements with the physical movements and position. This works as a sensing means and responding to the stimulus from the participant and adapted to provide a control input from the user-audience through a computer based system.

[0006] The three-dimensional interactive digital game location is a fully-tested commercially viable opportunity which is an integration (computer software integration) of a) the three-dimensional projection, b) three-dimension screen, c) digital video camera, d) audio microphone and speakers f) computer generated animated characters; g) computer developed game engine h) computer generated sensors j) three-dimension glass with audio k) device or set of device with embedded computer software to interact with all the devices almost seamlessly (these will be patented separately). This human-technology interactivity location will be an attraction to many children. As the cost of integration goes down the facility can be installed in the schools and institutions for many other use such as teaching and real-life simulation.

## Summary of Invention

[0007] In one embodiment, the present invention is to provide three-dimension photo-realistic physical game location environment in claim 1 which will provide information about the physical display of human or non-human animated characters are digitally interacting with the game participants. A 3D game in the physical location is also controlled virtually through a device or set of devices (media or apparatus) This will also allow participant to interact with a subject (called "Kalpona" – a Indian Hindu mythological rendition of imagination) based on his or her movements.

[0008] Another embodiment of the internal representation is based on the concept of providing a new combination of features offering a substantial advance in the potential to heighten human senses in three-dimension photo-realistic virtual environment to achieve interactive, participatory experiential games and activities. In one aspect the present invention consists in an apparatus for providing a virtual reality games and activity experience of the physical location game. The apparatus including audio output, video output and physical sensors. The apparatus further comprising a control system to synchronize audio, visual and physical of the participant to relate to one another. The apparatus further connected to computer based systems to process participant's physical and audio outputs and its interaction with the physical object to provide a three-dimension photo-realistic virtual-realty scenario update which is selected from a database and advances in a manner corresponding to user movements and engagements with the physical movement.

[0009] The present invention overcomes three primary problems in the prior work. In the present invention is a fully integrated system of a) the three-dimensional projection, b) three-dimension screen, c) digital video camera, d) audio microphone and speakers f) computer generated animated characters; g) computer developed game engine h) computer generated sensors j) three-dimension glass with audio k) device or

set of device with embedded computer software to interact with all the devices almost seamlessly (these will be patented separately). Second, because the information is stored and processed from both physical and virtual objects – both in audio and video, it enhances the experience of the interaction between physical (the participant of the game) and virtual (the user-audience) collaboration as it generates virtualized physical game images from any angle or viewing position. This also frees the participant to explore from any vantage point and not just prerecorded vantage point. Third, the processing of information and scrolling with the virtual subject (Kalpona) is so fast and personalized that it creates different three-dimension photo-realistic virtual reality images ( the fine detail captured by the cameras to be viewed in a way that CAD modeled environments are viewed) and thereby experience to different participants at the same time.

## Brief Description of Drawings

[0011] For the present invention to be clearly understood and readily practiced, the present invention will be described in conjunction with the following figures wherein:

- Figure 1: The physical look of the game location
- Figure 2: The gallery design and framework
- Figure 3: A block diagram how the physical structure and how images are integrated by a plurality of projection and cameras
- Figure 4: is the data flow diagram illustrating signal processing
- Figure 5: is the physical object embodiment
- Figure 6: is the pictorial illustration of a user environment reflected in a graphical environment according to the method and system of the present invention
- Figure 7: is the pictorial illustration of a user environment from a perspective of 'kalpona' according to the method and system of the present invention

## Detailed Description

[0012] The present invention is also directed to a new visual rendition of the human and non-human character which we referred to as three-dimension photo-realistic simulation. The physical objects (toys, action figures and other collectibles) are displayed in the location (hereinafter known as "physical object displays"). For reference we have two actors – the person actually playing the game and therefore interacting with the digitally rendered screens using a device (or set of devices) – (hereinafter known as "participant"). The other actor is the user of the game who either viewing the game in the game location or in the device screen (hereinafter known as "user-audience")

[0013] The host A stores three-dimensional image data for providing three-dimension photo-realistic virtual reality displays (hereinafter referred as PRVR displays)

such as streets of New York, London or other locations. These PRVR data has been collected for numerous situations – such as London road during winter, traffic jam, accident, earthquake, etc. and, therefore, do not change. When the basic data are not subject to update. This system provides the PRVR images of buildings, roads and other items to create an environment. The host A also stores data related to physical displays to trigger as audio input.

[0014] The host B controls update objects that constitute both audio output and a PRVR space. The update objects are human or non-human animated characters (also referred as “avatars”) for example representing the user–audience' response. Thus, the host B allows a plurality of user (or user–audience) to share the same virtual space. It should be noted that the host B controls only the update objects located in the display area (for example the virtual–reality display of New York) controlled by host A.

[0015] The virtual–service provider (hereinafter called "Kalpona") is like a client terminal which receive voice–activated data (from the visitors) and the sensor data (the physical movement based on camera movement of the visitor) and synchronize them to provide the input to the host B.

[0016] What follows, a procedure of communication between the participant of the game and 'Kalpona' are recorded and updated in the host B which triggers host A to display and/or generate audio output based on the information request from host B. A predetermined display attribute can be attached to overlay message. if the attached display attribute is for specifying scrolling or moving (synchronized with participant movement) the overlay message is displayed in a scrolled manner (giving an impression of movement). If the display attribute is for specifying reverse display, flashing , coloring, or display sizing, the overlay message is displayed as specified.

[0017] In addition to the above mentioned messages, there are such messages as a title and words of music to be played in a virtual reality space.

[0018] To generate data for the three–dimension photo–realistic virtual reality medium, images are recorded using projection and camera positioned to cover the events from all sides. As used herein, images could be discrete objects, environments, objects interacting with an environment. Each camera produces a series of images with each image being comprised of a plurality of pixels. The depth information is further manipulated to produce object–centered descriptions of everything within an image. We develop the stand–alone system to synchronously record frames from multiple cameras. The output of each projection and camera is time stamped with a common Vertical Interval Time Code (VITC). The time code allow us to correlate the frames across cameras which is crucial when transcribing movements and triggering effect through host A.

[0019] In a computer generated software code, control of the system is through the data glove or equivalent device. This is used by user physical movements to e.g., select from menus in the computer system.

[0020] All major motions must be monitored and processed by the PC in real-time. One known motion tracking system is called Motion Star wireless from Ascension Technologies. It is a wireless solution that can read up to 20 sensors in real-time. This kind of tracking is known as 6DOF (Six Degrees of Freedom) tracker. This allows the major movements of the human to be monitored by the system and the information to be processed and applied to the users "kalpona."

[0021] The human or non-human animated character is intended to be life-size form and have legs, arms, head and body. Outer structure would be of a flexible plastic material and closely mimic the touch of a human body. The human or non-human animated character will be responsible for providing any information (i.e., where it has been touched or what has been spoken to). This information is transmitted to PC via an interface card and the software.

[0025] As the interaction with the human or non-human animated character changes, the information recorded in the computer triggers host A to change the environment or updates with new three-dimension photo-realistic virtual reality environment.

[0026] Yet another solution is to allow users or visitors to walk on a "walking belt" and the sensors are attached to the persons legs and feet can be monitored for walking or running movement and thus can be moved accordingly within the virtual environment.

## Claims

[c1]

A concept of theme based game location for three-dimensional interactive digital games juxtaposed with human or non-human characters in animation with interactive, participatory, experiential games for children and families

A process of three-dimension photo-realistic virtual reality display (to display human or non-human animated characters or other collectibles) in a physical location that display three-dimensional photo-realistic virtual reality images on a display device comprising:

providing digital video information related to physical items that are displayed in the gallery to a three-dimensional virtual reality display screen



super-imposed digital audio information related to physical items that are relayed into a pre-set area within said three-dimensional virtual reality in a synchronized overlay manner

[c2]

A physical design of a hand-held device or set of devices (set of media or apparatuses) that is used to interact in the physical location with the three-dimensional photo-realistic virtual reality images. This device or set of devices are designed to capture response – both movement and audio – from the participant and the user-audience and recorded in a computer-based device on a display device of Claim 1 for processing and triggering three-dimension photo-realistic virtual reality images.

[c3]

A user interactive apparatus with the three dimension photo for providing a virtual-reality sporting or inter-activity experience on a three-dimension photo realistic virtual-reality display device as claimed above in Claim 5, the apparatus comprising: –

audio reproduction means having an audio output –

visual reproduction means having three-dimensional photo-realistic virtual-reality visual output

the physical object (mannequin or other physical objects) which is superimposed with three-dimensional photo-realistic virtual-reality images to create an environment

a control system synchronizing and interrelating the audio, video and physical movements relative to one another

the control system including a data base and computer based system for providing-a scenario output for the audio output and the three-dimensional photo-realistic visual output

the physical object (mannequin or other physical object) further having control signal generators that are responsive to the movement (sensor) and the position(sensor) and that provide signal outputs that are received by the control system and that are responsive to, representative of, and synchronized with the body movement of the participant when the participant is so associated with the physical activity –

the control system further including software that is responsive to database and to the received signal outputs, and that regulates the scenario content so that the audio output and the visual output are synchronized and correspond to the movement of the participant

[c4]

The process and software (application and computer codes) for apparatus of Claim 10 wherein the database, java and xml based codes that interacts with the physical screen and the apparatus screen that includes more than one scenario output type and wherein one scenario output type is selectable by the administrator or the player in order to play in the physical location

## Abstract of Disclosure

[0027] A design and process of theme-based park or game location for three-dimensional interactive digital games with a juxtaposition of human or non-human characters in digitally rendered animation with interactive, participatory, experiential games for children and families. The location provides an exhibition display animated characters in a three-dimension photo realistic environment which, in turn creates a thematic environment. The same characters are used in digitally rendered three-dimension photo-realistic forming a game location (for example: G.I. Joe characters in the exhibition and the same characters with all G.I. Joe accessories creating an environment for a game - say laser tag) for children to play physical-digital interactive, participatory, experiential games with their human or non-human digitally rendered animated characters. Players (children) play games using a device or set of devices (also referred as media or apparatus) that has computer application and software code which allows the device or set of devices to interact with the three-dimension photo-realistic digitally rendered characters in the environment. The device or set of devices also allows more than one users to interact with the player through the screen on the device to play the game.

The three-dimensional interactive digital game location is a fully-tested commercially viable opportunity which is an integration (computer software integration) of a) the three-dimensional projection, b) three-dimension screen, c) digital video camera, d) audio microphone and speakers f) computer generated animated characters; g) computer developed game engine h) computer generated sensors j) three-dimension glass with audio k) device or set of device with embedded computer software to interact with all the devices almost seamlessly (these will be patented separately). This human-technology interactivity location will be an attraction to many children. As the cost of

integration goes down the facility can be installed in the schools and institutions for many other use such as teaching and real-life simulation.

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